



PATENT: 05918P2 USA

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Appl. No. : 09/847,883 : Confirmation No.: 5807  
Applicant : Roberts, D. A., et al.  
Filed : May 3, 2001  
For : Low VOC Clean Room Cleaning Wipe  
  
Art Unit : 1771  
Examiner : Boyd, J.A  
  
Docket No. : 05918P2  
Customer No. : 23543

Commissioner for Patents  
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Sir:

**BRIEF ON APPEAL UNDER 37 CFR 41.37(c)(1)**

This appeal is from the Final Rejection of February 24, 2005.

**REAL PARTY IN INTEREST**

Air Products & Chemicals, Inc. is the real party in interest in the appeal. The assignment has been recorded at Reel/Frame 012022/0772.

**RELATED APPEALS AND INTERFERENCES**

There are no related appeals or interferences.

### **STATUS OF CLAIMS**

Claims 4-11, 13-20, and 22-25 are pending in the application. Claims 4-11, 13-20, 22 and 23 are the subject of this appeal. Claims 24 and 25 were the subject of restriction and are to be considered withdrawn from the appeal.

### **STATUS OF AMENDMENTS**

No amendments have been filed subsequent to the Final Rejection of February 24, 2005.

### **SUMMARY OF CLAIMED SUBJECT MATTER**

The invention relates to a prewetted cleaning wipe for use in cleaning surfaces in an electronics clean room having low VOC content and low NVR content (page 4, lines 12-18). The wipe is comprised of a substrate, e.g., a woven or nonwoven material (page 6, lines 8-17) wetted with an aqueous cleaning solution consisting essentially of water and from 0.001 % to 0.5% of an acetylenic diol (page 6, lines 3-7). Wipes incorporating high levels of alcohols and solvents, previously used in cleanroom applications are no longer tolerated by the industry (page 3, lines 10-15 & page 4, lines 8-9 & 23-24). Applicants' wipe has the necessary low VOC/NVR content to meet current electronic cleanroom standards.

Independent Claim 23 claims a wipe consistent with the description above and with reference to the same sections of the Specification.

Independent Claim 20 claims a wipe consistent with the description above, but is directed to a woven substrate, an NVR level (page 4, lines 15-18), a Markush group for the treated water (page 6, lines 18-19) and a Markush group for the acetylenic diol (page 5, line 17-page 6, line 2).

The dependent claims will not be separately argued and are thus not separately described herein.

### **GROUND OF REJECTION TO BE REVIEWED ON APPEAL**

Claims 4-11, 13-15, 17-19 and 23 have been rejected on the grounds of obviousness under 35 U.S.C. §103(a), on Morin, et al US 6,189,189 ("Morin, et. al."), teaching a clean room wiper with preferably water and 2-propanol, in view of Wilkinson, et al EP 0830890 ("Wilkinson, et. al."), teaching acetylinic diols as additives to supercritical CO<sub>2</sub> cleaning fluids capable of cleaning silicon wafers.

Claims 20 and 22 have been rejected on the grounds of obviousness under 35 U.S.C. §103(a), on Morin, et al, Wilkinson, et al and Watts, et. al., EP 0 389612 B1 ("Watts, et. al"), the latter teaching a cleaning wipe with cotton and polyester content in the wipe substrate.

### **GROUPING OF CLAIMS**

All claims stand and fall together.

### **ARGUMENT**

#### **Rejection of Claims 4-11, 13-15, 17-19 and 23 Under 35 U.S.C. §103(a)**

The Examiner in establishing the alleged *prima facie* case of obviousness of Claims 4-11, 13-15, 17-19 and 23 under 35 U.S.C. §103(a), cited Morin, et al US 6,189,189 in view of Wilkinson, et al EP 0830890. Details supporting the rejection were referenced in the Examiner's Office Action of October 20, 2004 (page 3, Para. 4).

Summarizing from pages 2, 3 and 4 of the October 20, 2005 Office Action, Morin, et al was cited by the Examiner as directed to a method of manufacturing clean room wiper which may be saturated with a desired solvent, such as; water, organic solvents, e.g.,

naphtha, and aqueous solution water miscible solvents, in particular alcohols such as C<sub>1-8</sub> alcohols (col. 7, lines 15-21).

Wilkinson, et al was cited as disclosing the use of surfactants in liquid/supercritical CO<sub>2</sub> in electronic cleaning operations, e.g., silicon wafer cleaning (page 5, lines 12-13). Tetramethyl decyne diol and dimethyl octynediol are listed in Wilkinson, et al., as representative of the surfactants.

The Examiner concluded it would have been obvious to use the acetylenic alcohols of Wilkinson, et al, as the alcohol of choice, in the wiper of Morin, et al, e.g., even though the suggested application was for facilitating the solubility of CO<sub>2</sub> in water in the cleaning of silicon wafers **under supercritical conditions**, not the ambient conditions of an operator manually using the cleaning wiper of Morin, et. al. The alleged motivation for using the acetylenic diol of Wilkinson, et al, in the Examiner's view, was that the acetylenic diols were used in an electronics cleaning operation application and that the environment where the cleaning takes place is irrelevant (Final Rej. page 4, para. 7). Hence, one allegedly would have been motivated to use the acetylenic diol with a wiper since the diol had application in an electronics type application.

Applicant's Response to Prima Facie Case of Obviousness Under 35 U.S.C. §103(a)

To facilitate resolution of the issue of obviousness over Morin, et al in view of Wilkinson, et al, Applicants will focus on independent Claims 20 and 23 and will not refer to the other elements in any of the dependant claims for purposes of establishing patentability of these claims beyond that of the independent claims.

Claims 20 and 23 each have, *inter alia*, with respect to the wipe for an electronics clean room (1) a substrate and (2) a cleaning or wetting solution. A key to the Applicants' wipe for use in electronic cleanrooms resides in a wetting solution consisting essentially of

water and a small amount of acetylenic diol, i.e., from 0.001 to 0.5%, which is carried by the substrate. This aspect, for example, is characterized in the improvement portion of Applicants' Claim 23. Both claims also call for a wipe having both low volatile organic chemicals (low VOC) and low non volatile residue (low NVR), and thus the addition of VOC and/or NVR contributing components substantially affecting the basic and novel VOC/NVR property of the wipe would be excluded by the "consisting essentially of" language of the present claims.

In considering the technical analysis of Applicants' Claims 20 and 23, vis-à-vis Morin, et al., it is important to focus clearly on the terminology employed by both. Applicants employ the term "wipe" to note the combination of substrate **and** the aqueous cleaning solution, whereas Morin, et al use the term "wiper" interchangeably sometimes referring **only** to the "substrate", which is the predominant teaching of its patent, and sometimes to the combination of (1) the substrate and (2) the cleaning solution.

Morin, et al

Applicants assert that Morin, et al disclose nothing more than what has been admitted by Applicants as prior art, i.e., wipers comprised of a substrate and non-critical teachings of general cleaning solutions and their use in an electronics cleanroom. They also point out the stringent requirements for a wiper in an electronics cleanroom applications (col. 1, lines 28-35).

In the context of Applicants' claims, Morin, et al is directed **predominantly** to a method of manufacturing polyester fabrics as a substrate for wipers suited for use in electronic cleanrooms, such that the resultant wiper (the polyester substrate) release fewer particulate contaminants (col. 1, lines 5-8) and extractable components of the substrate material itself (col 4, lines 55-61). Morin, et al disclose the suitability of their wiper in Class

100 cleanrooms (col. 1, lines 59-65) as well as pharmaceutical and paint preparation applications (col. 7, lines 16-17). At col. 4 lines 20-67, Morin, et al clearly indicate their effort for reducing contamination by the wiping of surfaces is **directed solely** to the polyester material employed in the wiper, **not** the impregnating solution. In that regard, a substantial section of the Morin, et al specification teaches the physical properties of the substrate polyester textile fabric as it relates to the standards which may be imposed upon cleanroom wipers, such as sorbency and contaminates. Sorbency has to do with the **substrate** employed in the wiper, not with the cleaning solution. Morin, et al disclose testing procedures for determining extractable contamination of components within the substrate as for example by contacting the substrate with a solvent, e.g., water, alcohols, acetone, etc. (col. 4, lines 55-58). They also measure particulate emission, which is also attributable to the substrate (Table 2 at col. 6).

Summarizing, Morin, et al are concerned with two major issues with respect to the use of their polyester textile fabric wiper substrate in a variety of applications including an electronic cleanroom. Those major issues are: (1) that the polyester textile fabric substrate itself alone should release **fewer particulates**; and, (2) the polyester textile fabric substrate itself alone have very **little extractable material**, including unspecified extractable material and ionic contaminants, which can lead to contamination in an electronic cleanroom when in contact with solvents (col. 1, lines 33-36). Morin, et. al. analyzes for issue (2) by testing to extract material from the polyester textile fabric using water and isopropyl alcohol (col. 4, lines 55-61) to extract the extractables from the fabric, and not with any teaching that the water and/or the isopropyl alcohol represent the problem and the source of VOCs and NVRs, which problem the present invention solves by achieving low VOCs and low NVRs.

To apply Morin, et al under 35 U.S.C. §103(a) to Applicants' claimed subject matter set forth in Claims 20 and 23 as a whole, the Examiner must also look to what Morin, et al

teach with respect to the impregnating or wetting solutions for the substrate and their application. That disclosure is found in Morin, et al at col. 7, lines 18-34. A wide range of solvents, e.g., 1-99% water/alcohol, organic solvents, e.g., naphtha, and the use of surfactants for the wiping of semiconductor, pharmaceutical cleanrooms, as well as surfaces to be painted are suggested. Morin, et al **teach essentially no specificity** as to type and amount of solvent **nor do Morin, et al. suggest levels of wetting agents** that approach what Applicants' claim as a component of their wipe. Also, reference is made to multiple patents showing the **indifference** by Morin, et al with respect to the cleaning solutions that can be used with their polyester fabric in wiper and prepackaged wipe applications, in contrast to Morin, et. al.'s **high sensitivity** to the selection and the physical properties of the polyester textile fabric substrate. The selection of the cleaning solution in Morin, et. al. is left to the discretion of the end user.

Morin, et. al.'s teaching and suggestion is that the **substrate of polyester textile fabric, not the impregnated cleaning solution, is the source of contamination** and the substrates proper selection is the solution to the problem. That teaching of Morin, et. al. is inconsistent with the problem overcome by the present invention and the present invention's solution to that problem.

Morin, et. al. fails to provide any suggestion that an alternative impregnating cleaning fluid is desirable to provide a solution to the problem of clean room wipe contamination.

Morin, et. al. is unilaterally focused on solving clean room wipe contamination by selection of the **appropriate substrate** and not by any suggestion to select a particular impregnating cleaning solution. Morin, et. al. does not recognize any problem of contamination arising from the selection of the impregnating cleaning solution.

Wilkinson, et al

At this stage of the analysis under 35 U.S.C. §103(a), the suggestion of the incorporation of an acetylenic diol in an aqueous cleaning solution for a wiper has not been taught. The Examiner cites Wilkinson, et al as showing (a) acetylenic diols as a surfactant and (b) their use in super critical CO<sub>2</sub> cleaning of electronic components. The Examiner takes the position that "...the environment in which the cleaning takes place is irrelevant since Wilkinson, et al does demonstrate that surfactants such as acetylenic diols are useful in cleanroom application." (Final Rej. page 4, para. 7)

Applicants assert that there is nothing in the disclosure of Wilkinson, et al that would have motivated one skilled in the art faced with the problem of developing a low VOC/NVR wipe for use in electronic cleanrooms to consult Wilkinson, et al. First, Applicants respectfully disagree with the Examiner that Wilkinson, et al suggest that small amounts of acetylenic diols have been employed in a cleanroom. These diols were used in **high pressure, supercritical CO<sub>2</sub> cleaning cells** to test the cleaning of silicon wafers, **not cleanrooms**. The data at page 5 show the acetylenic diol is added to a mixture of CO<sub>2</sub> and water to facilitate water uptake by the supercritical fluid CO<sub>2</sub>. This is done at very high pressures, e.g., 2000 psi and above. Second, Applicants assert that a teaching of cleaning wafers in a high pressure cell with CO<sub>2</sub> has **no relevance** to wipers for cleaning surfaces in electronic clean rooms.

**The behavior of acetylinic diols under supercritical conditions, where those skilled in the art fully appreciate that materials exhibit decidedly different physical properties, would provide no reasonable teaching or suggestion of what acetylinic diols would do under the ambient conditions of a human operator manually using an acetylinic diol saturated wipe in a clean room.**



Therefore, Wilkinson, et. al. is non analogous art and meaningless in the analysis of nonobviousness under 35 U.S.C. §103(a).

Assuming for purposes of discussion that Wilkinson, et al were remotely relevant as to the issue of obviousness 35 U.S.C. §103(a) as related to Claims 20 and 23, there is no teaching in Wilkinson, et al that the cleaning solution of Morin, et al, be modified to an aqueous solution "consisting essentially of" a small amount of acetylenic diol; and excluding the high levels of alcohols permitted by Morin, et al, e.g., 99% isopropanol (col. 7, line 25). In that regard, the Examiner has not cited any teaching in either reference that would suggest to one skilled in the art to select a low VOC/NVR cleaning solution to be employed with the Morin, et al substrate to overcome **the unidentified problem of volatile and nonvolatile contamination of cleanrooms sourced from the cleaning solution** in clean room wipes.

Summarizing, Wilkinson, et al in combination with Morin, et al do not establish a *prima facie* case of obviousness with respect to any of Applicants' Claims 4-11, 13-15, 17-19 and 23, for a rejection under 35 U.S.C. §103(a).

**Rejection of Claims 20 & 22 on Morin, et al, Wilkinson, et al & Watts, et. al. EP 0 389612 B1**

Claims 20 and 22 were rejected over the above references in view of Watts, et. al. The Examiner is using Watts, et. al. to provide the motivation for using a cotton/polyester substrate. If the Board of Patent Appeals and Interferences finds that a *prima facie* case of obviousness has been made by Morin, et al in view of Wilkinson, et al with respect to independent Claims 20 and 23, then, it would be agreed that the substitution of a cotton/polyester substrate for the Morin, et al substrate would not be separately patentable.

In paragraph 9 of the Office Action 24 February 2005, the Examiner noted that a showing of unexpected results by the Applicants in a Declaration under 37 CFR 1.132 comparing a sufficient number of tests both inside and outside the claimed range and comparing to the closest prior art would be necessary to render the claimed ranges of acetylinic diol patentable. It is respectfully asserted that the language "consisting essentially of" excludes the kinds of solvents suggested by Morin, et al, which at effective levels, would contribute to a high VOC level, e.g., 1-99 % isopropanol. Those levels are excluded by the present claims, as such wipes would not meet the VOC requirements of electronics cleanrooms. Wilkinson, et. al. does not use acetylinic diols in an analogous technology. Therefore, there is no need to submit Rule 132 evidence to render the ranges of acetylinic diols patentable over the cited prior art of record.

Conclusion

Applicants assert that a *prima facie* case of obviousness of the subject matter of the present Claims has not been established by Morin, et al, Wilkinson, et al and Watts as required under 35 U.S.C. §103(a). Therefore, Applicants respectfully assert that the final rejection of the Examiner should be reversed and a direction be issued to the examiner that the application be passed to issue.

Respectfully submitted,



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CLAIMS APPENDIX

Claims On Appeal

4. The cleaning wipe of Claim 23 wherein the acetylenic diol is present in the range of 0.01% to 0.3% by weight.

5. The cleaning wipe of Claim 4 wherein the acetylenic diol is present in the range of 0.05% to 0.2% by weight.

6. The cleaning wipe of Claim 5 wherein the acetylenic diol has a vapor pressure of at least  $1 \times 10^{-4}$  torr at 25°C.

7. The cleaning wipe of Claim 6 wherein the acetylenic diol has a vapor pressure of at least  $1 \times 10^{-3}$  torr at 25°C.

8. The cleaning wipe of Claim 7 wherein the acetylenic diol is dimethyl octynediol.

9. The cleaning wipe of Claim 7 wherein the acetylenic diol is tetramethyl decynediol.

10. The cleaning wipe of Claim 4 wherein the wipe substrate is selected from the group consisting of: cotton, abaca, polyester, nylon, polyester/cellulose, rayon, polypropylene, rayon/polyester, polypropylene/cellulose, polyurethane, cotton/polyester and mixtures thereof.

11. The cleaning wipe of Claim 4 wherein the acetylenic diol is selected from the group consisting of: dimethyl octynediol; tetramethyl decynediol; 2,6,9,13-tetramethyl-2,12-tetradecadien-7-yne-6-9-diol; 2,6,9-trimethyl-2-decen-7-yne-6-9-diol;; 7,10-dimethyl-8-hexadecyne-7,10-diol; 2,4,7,9-tetramethyl-5-decyne-4,7-diol; 4,7-dimethyl-5-decyne-4,7-diol; 3,6-diethyl-4-octyne-3,6-diol; 2,5-dicyclopropyl-3-hexyne-2,5-diol; 2,5-diphenyl-3-hexyne-2,5-diol; 3,5-dimethyl-1-hexyn-3-ol, 2,5,8,11-tetramethyl-6-dodecyne-5,8-diol and mixtures thereof.

13. The cleaning wipe of Claim 11 wherein the wipe substrate is a fibrous substrate.

14. The cleaning wipe of Claim 11 wherein the wipe substrate is a woven fibrous substrate.

15. The cleaning wipe of Claim 11 wherein the wipe substrate is a nonwoven fibrous substrate.

16. The cleaning wipe of Claim 11 wherein the wipe substrate is a sponge.

17. The cleaning wipe of Claim 11 wherein the water is high purity water.

18. The cleaning wipe of Claim 11 wherein the water is deionized water.

19. The cleaning wipe of Claim 11 wherein the water is distilled water.

20. A prewetted cleaning wipe for cleaning surfaces in an electronic materials fabricating area having a low volatile organic chemical content in the range of 0.001% to 0.5% by weight and low nonvolatile residue property of at least  $1 \times 10^{-4}$  torr at 25°C comprising; a woven fibrous polyester/cellulose wipe substrate wetted with an aqueous solution consisting essentially of high purity water selected from the group consisting of distilled water and deionized water, and from 0.001 % to 0.5% by weight of an acetylenic diol surface active agent selected from the group consisting of dimethyl octynediol, tetramethyl decynediol and mixtures thereof.

22. The cleaning wipe of Claim 20 wherein the acetylenic diol surface active agent is present in an amount from 0.05% to 0.2% by weight.

23. In a cleaning wipe for use in cleaning an electronics fabrication industry clean room comprising a wipe substrate wetted with a cleaning solution, the improvement which resides in a cleaning wipe having low volatile organic chemical and low nonvolatile residue properties comprising a wipe substrate wetted with a solution consisting essentially of water and from 0.001% to 0.5% by weight of an acetylenic diol.

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## EVIDENCE APPENDIX

None

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RELATED PROCEEDINGS APPENDIX

None